

## CLAIMS

## WE CLAIM:

1. A method of enabling lookups between connected devices, the method comprising:
  - generating one or more cryptographic keys associated with a namespace;
  - creating an authority using one of the cryptographic keys;
  - enabling one or more namespaces to refer to the authority via requesting authorities associated with the one or more namespaces to issue a peer-to-peer type resolution so that names of the namespaces resolve to the authority; and
  - for any other namespaces to which communication is desired, issuing a resolution that names the authority and one or more names associated with the other namespaces to resolve to one or more of the other authorities.
2. The method of claim 1 wherein the connected devices are part of a peer-to-peer network cloud.
3. The method of claim 1 wherein the peer-to-peer type resolution means that for one or more namespaces  $S_1, S_2 \dots S_N$  with names  $N_1, N_2 \dots N_N$  for which communication and referencing is desired a request to authorities is made for the namespaces to issue  $([S_1].N_1) \rightarrow A, ([S_2].N_2) \rightarrow A \dots ([S_N].N_N) \rightarrow A$  so that the names  $N_1, N_2 \dots N_N$  resolve to the authority.
4. The method of claim 1, further comprising:
  - for any services, publishing the authority and a service name to receive an end result that provides data.
5. The method of claim 1, further comprising:
  - for any services, publishing the authority and a service name to receive an IP address, a protocol name and a port.
6. The method of claim 1 further comprising:

dynamically changing one or more addresses associated with the authority via delegating the authority to another name associated with one or more added addresses.

7. The method of claim 1 wherein the lookup resolves to one of arbitrary data, hosts and services.
8. The method of claim 1 wherein creating the authority includes performing a hash of the cryptographic key, the cryptographic key being a public key from a private key-public key pair.
9. A method for implementing a service over the Internet, the method comprising:  
generating one or more keys for the service to provide an authority;  
requesting an administrator of a top level domain to publish a resolution to the service;  
delegating the authority to a subgroup of the service; and  
publishing the service over the Internet.
10. The method of claim 9 wherein the authority is a hash of one of the generated keys.
11. The method of claim 9 wherein delegating the authority includes creating a second authority that refers to the authority.
12. The method of claim 9 wherein publishing the service includes publishing a resolution that identifies an end result.
13. The method of claim 12 wherein the end result is one or more of arbitrary data, a port number, protocol name and IP address for the service
14. A method for operating a name resolution service, the method comprising:  
resolving an authority and name combination to a second authority; and  
resolving the second authority to a further authority or to an end result.
15. The method of claim 14 wherein the end result is arbitrary data.

16. The method of claim 14 wherein the end result is a port, protocol name, and IP address.
17. The method of claim 14 wherein the name resolution service is in a peer-to-peer system, the resolving independent of requiring resolution to an IP address.
18. The method of claim 14 wherein the name resolution service is in a directory name service (DNS), the resolving independent of requiring resolution to an IP address.
19. A data structure for implementing a name resolution protocol, the data structure comprising:
  - an authority component associated with a public key, the public key being part of a private key-public key pair; and
  - a name component associated with a namespace of the owner of the private key-public key pair, wherein the authority component and the name component are capable of resolving to a second authority or to an address of a machine.
20. The data structure of claim 19 wherein the authority component and the name component are capable of resolving to a port number, protocol name, and IP address.
21. The data structure of claim 19 wherein the authority component and the name component are capable of resolving to arbitrary data
22. The data structure of claim 19 wherein one or more of an IP address, protocol name and port can be retrieved from a cache.
23. A computer readable medium having stored therein instructions for performing acts for enabling lookups between connected devices, the acts comprising:
  - generating one or more cryptographic keys associated with a namespace;
  - creating an authority using one of the cryptographic keys;
  - enabling one or more namespaces to refer to the authority via requesting authorities associated with the one or more namespaces to issue a peer-to-peer type resolution so that names of the namespaces resolve to the authority; and

for any other namespaces to which communication is desired, issuing a resolution that names the authority and one or more names associated with the other namespaces to resolve to one or more of the other authorities.

24. The computer readable medium of claim 23 wherein the connected devices are part of a peer-to-peer network cloud.
25. The computer readable medium of claim 23 wherein the peer-to-peer type resolution means that for one or more namespaces  $S_1, S_2, \dots, S_N$  with names  $N_1, N_2 \dots N_N$  for which communication and referencing is desired a request to authorities is made for the namespaces to issue  $([S_1].N_1) \rightarrow A, ([S_2].N_2) \rightarrow A \dots ([S_N].N_N) \rightarrow A$  so that the names  $N_1, N_2 \dots N_N$  resolve to the authority.
26. The computer readable medium of claim 23 wherein the acts further comprise:  
for any services, publishing the authority and a service name to receive one or more of arbitrary data, an IP address, a protocol name and a port.
27. The computer readable medium of claim 23 wherein the acts further comprise:  
dynamically changing one or more addresses associated with the authority via delegating the authority to another name associated with one or more added addresses.
28. The computer readable medium of claim 23 wherein the lookup resolves to hosts and services.
29. The computer readable medium of claim 23 wherein the lookup resolves to arbitrary data.
30. The computer readable medium of claim 23 wherein creating the authority includes performing a hash of the cryptographic key, the cryptographic key being a public key from a private key-public key pair.
31. A computer readable medium having stored therein instructions for performing acts for implementing a service over the Internet, the acts comprising:  
generating one or more keys for the service to provide an authority;

requesting an administrator of a top level domain to publish a resolution to the service;

delegating the authority to a subgroup of the service; and  
publishing the service over the Internet.

32. The computer readable medium of claim 31 wherein the authority is a hash of one of the generated keys.

33. The computer readable medium of claim 31 wherein delegating the authority includes creating a second authority that refers to the authority.

34. The computer readable medium of claim 31 wherein publishing the service includes publishing a resolution that identifies a port number, protocol name and IP address for the service.

35. A computer readable medium having stored therein instructions for performing acts for operating a name resolution service, the acts comprising:

resolving an authority and name combination to a second authority;  
resolving the second authority to a further authority or an end result.

36. The computer readable medium of claim 35 wherein the end result is one or more of arbitrary data, a port, protocol name, and IP address.

37. The computer readable medium of claim 35 wherein the name resolution service is in a peer-to-peer system, the resolving independent of requiring resolution to an IP address.

38. The computer readable medium of claim 35 wherein the name resolution service is in a directory name service (DNS), the resolving independent of requiring resolution to an IP address.